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EXAMINER

BRODA, SAMUEL

ART UNIT PAPER NUMBER

2123

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/945,306

Applicant(s)

DONG ET AL.

Examiner

Samuel Broda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on Applicant's Amendment mailed on 5/9/2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 17-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 17-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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### DETAILED ACTION

1. This communication is in response to Applicant's Amendment and Response (the "Amendment") mailed on 9 May 2005. Claims 1-7, 17 and 26 were amended; claims 11-16 were canceled; claims 1-10 and 17-26 are pending.

### *Claim Rejections - 35 U.S.C. § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2.1 Claims 1-8, 17-23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padula et al, "Multidisciplinary Optimization Branch Experience Using iSIGHT Software," in view of Cofer et al, "System Level Optimization Through the Use of Statistical Simulation," IEEE Conference Record of Southcon/96, pp. 521-525 (June 1996).

2.2 Regarding amended claims 1-8, 17-23, and 26, Padula et al teaches use of the "iSIGHT" software system for integrating a set of single-disciplinary modules for performing system level optimization for the following applications: launch vehicle sizing, aerospike nozzle design, trajectory optimization, and acoustic liner research. See "Aerospace Applications of

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iSIGHT” at pages 3-8; see also Fig. 3 displaying the integration of two simulation code blocks to perform the launch vehicle sizing optimization. According to Padula et al at page 6 paragraph 2:

Although the aerospike implementation is not yet complete, the iSIGHT framework has many obvious advantages for solving large MDO problems. It provides a method for connecting several simulation codes together without changing any of the codes. Unlike the iSIGHT framework implementation, the original approach to the aerospike nozzle implementation, where one large program is defined, does not lend itself to experimenting with the single discipline analyses and optimizations, nor the integrated analysis and optimization. Not only does this iSIGHT framework feature make it quick and easy for the system developer; it also aids the disciplinary experts who need to run their codes in stand-alone mode as well as integrated into the system.

The features of iSIGHT in the optimization implementation taught by Padula et al does not appear to disclose the amended limitations in method and system claims 1-8, 17-23, and 26, corresponding to executing the multi-disciplinary module using an interface that communicates with the single-disciplinary modules, and performing a system level optimization using global inputs and outputs.

However, Cofer et al teaches a statistical simulation methodology in which multiple physical simulators are connected to the “STADIUM” software program. See pages 521-522. Once connected, a top level user interface “allows a non-statistician manufacturing engineer to straightforwardly set up manufacturing Design of Experiment analyses.” See page 523 column 2 paragraph 2.

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According to Cofer et al at page 521 column 2 paragraph 3:

... Most simulators require the user to possess in depth knowledge of both the manufacturing processes and the specific workings of the simulator packages themselves. Our solution to this problem involves a user-friendly input system where a user easily enters the specifics of the system to be manufactured.

Additionally, Cofer et al at page 522 column 2 paragraph 1 describes the benefits arising from the abilities of the “STADIUM” to be ‘readapted,’ corresponding to Applicant’s use of “reusable components”:

... The software architecture of the STADIUM package facilitates the ready integration of alternate simulators from a variety of vendors. Thus STADIUM also lends itself to the flexible system engineering concept by itself being readily readapted to newly emerging variations of the system and manufacturing processes.

**2.3** Regarding amended claims 1-8, 17-23, and 26, it would have been obvious to one of ordinary skill in the art at the time of Applicant’s invention to modified the “iSIGHT” software of Padula et al to incorporate the user-friendly features of the “STADIUM” including a single interface that communicates with at least two single disciplinary modules to run a system level optimization, because such a combination would provide both a user-friendly input system and would lend itself to a flexible engineering concept.

**2.4** Claims 9-10 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padula et al, in view of Cofer et al, and further in view of Amundsen et al, “Preliminary

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Thermal Analysis of a Mars Sample Return Earth Entry Vehicle,” American Institute of Aeronautics and Astronautics, AIAA-2000-2584, pp. 1-10 (2000).

**2.5** Regarding claims 9-10 and 24-25, the combination of Padula et al and Cofer et al does not appear to explicitly teach optimization using thermal analysis and TPS thickness analysis modules. However, Amundsen et al describes the separation of thermal models into four phases corresponding to cruise with the spacecraft, post-separation exo-atmospheric cruise, atmospheric entry to landing, and post-landing. Amundsen et al at page 3 column 1 paragraph 3. Further according to Amundsen et al at page 2 column 1 paragraph 2:

The thermal analysis results are valuable for several reasons. First, the thermal environment experienced by the returned samples can be predicted, and if not acceptable for science reasons, design modifications can be made. The thermal history of each material in the vehicle design can also be compared to its survival range, to ensure that all designed materials are adequate. The thermal predictions for operational mechanical and electronic components can be used to ensure they remain within their acceptable thermal range. Another use for the thermal predictions is to predict thermal stresses and deflections in the vehicle. The exo-atmospheric phases involve cold temperatures and slow changes, as well as a moderate gradient across the vehicle. The entry phase involves very rapid changes in temperature and gradients across the vehicle. Each thermal case can be used for structural analysis of the vehicle, to determine if unacceptable stresses or deflections are encountered.

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Regarding claims 9-10 and 24-25, it would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have modified the combined system of Padula et al and Cofer et al to incorporate the thermal analysis models of Amundsen et al, because the resulting system would combine the thermal analyses with the structural analyses and permit the modeling of each of the distinct thermal phases an earth entry vehicle would encounter.

### *Applicant's Arguments*

**3.1** Applicant argues at pages 9-10 of the Amendment that the rejections under Section 101 and Section 112, second paragraph are inapplicable to the amended claims.

**3.2** Applicant additionally argues at pages 10-12 that the rejections under Sections 102 and 103 are inapplicable to the amended claims because Padula et al does not suggest the interfacing of single-disciplinary modules and fails to provide any hint of creating a system level, multi-disciplinary module. Applicant also argues that iSIGHT users perform different functions and analysis, and achieve different results than those functions performed by the chief engineer and single-disciplinary engineers using Applicant's claimed method.

### *Examiner's Reply*

**4.** The Examiner respectfully disagrees for the following reasons:

**4.1** Regarding the rejections previously made under Section 101 and Section 112, second paragraph, these rejections are withdrawn.

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4.2 Regarding the rejections previously made under Section 102 and Section 103, revised rejections made above using a new reference that when combined with the prior references clearly meet the limitations of the amended claims. Although Applicant's argument regarding the different {functions, analysis, results} provided by iSIGHT is not persuasive, the addition of the Cofer et al reference describes several justifications for global inputs managed by a user-friendly interface to perform a system-level optimization and achieve the type of {functions, analysis, results} corresponding to Applicant's claimed method.

### *Conclusion*

5. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.



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7. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (571) 272-3709. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Leo Picard, can be reached at (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (571) 272-2100.



**SAMUEL BRODA, ESQ.**  
**PRIMARY EXAMINER**